Paper No. 5

TISSUE CULTURE STUDIES ON THE MECHANISMS OF ACTION OF MALEIC HYDRAZIDE AND 6-AZAURACIL

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ABSTRACT

One of the problems encountered in studies concerned with the mechanism of action of specific compounds is the uptake and availability of each compound in question. One way to lessen the effects is to check the inhibition of growth in tissue culture. Cells of the interspecific hybrid N. SuSu11 grow rapidly on a defined agar medium and have served as a useful tool in the study of such growth inhibitors as azauracil and maleic hydrazide. Growth of tobacco cells can be completely inhibited by the addition of 10^{-3}M azauracil to the agar medium. The inhibition is reversible with the addition of uracil or uridine to culture medium. Thus, it appears that the growth response to azauracil is similar in tobacco cells and bacterial cells. The inhibition of these cells by maleic hydrazide is not reversible with uracil and uridine. The mechanism of action is very different for these two inhibitors. The growth inhibition of azauracil and maleic hydrazide was observed with tissue of N. tabacum as well as with one of the parental types of the hybrid.

REVIEW BY H. C. SILBERMAN

This paper is part of the symposium on the biochemical aspects of the growth and development of tobacco suckers. It deals with the drying out of known growth inhibitors.

Azauracil is an anticancer drug reported by Czechoslovakian researchers. The formulae of the inhibitors used are given below:

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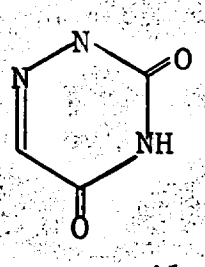
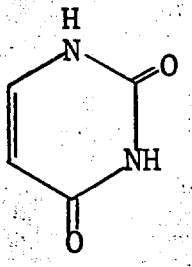
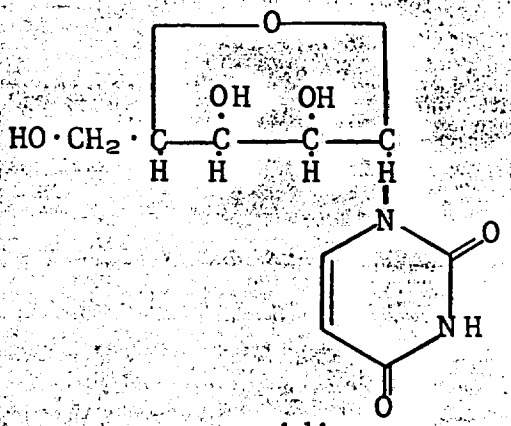


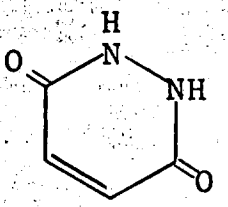
6-azauracil



uracil
(2,4-dioxopyrimidine)

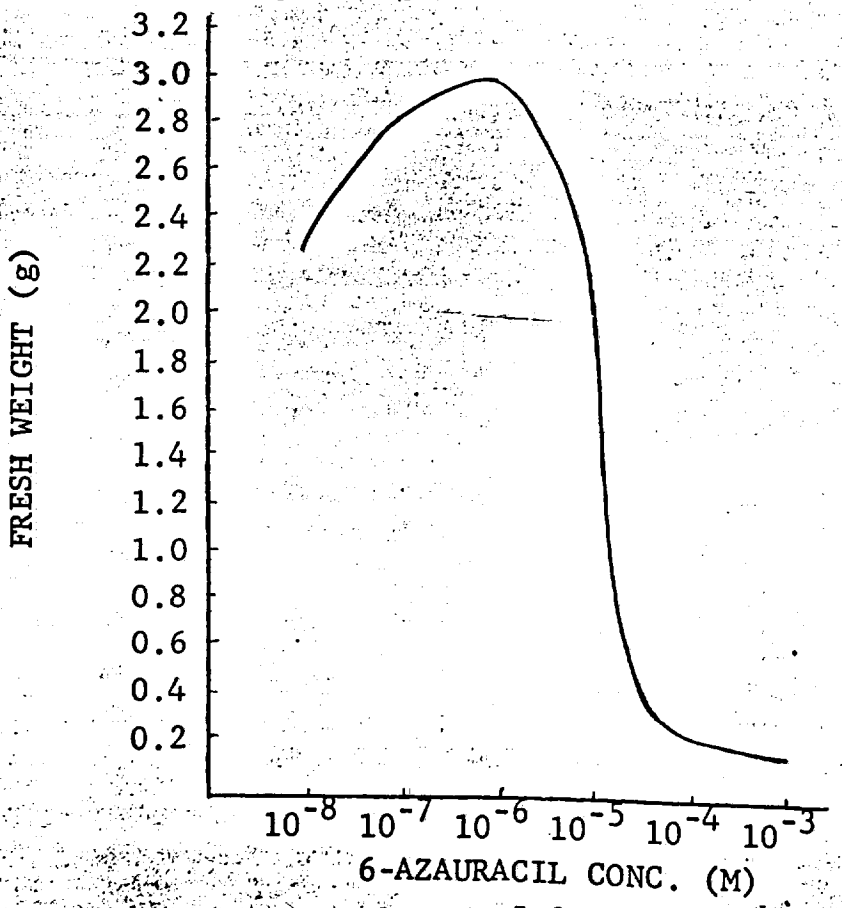


uridine



maleic hydrazide

The effect of azauracil, uracil, and uridine alone was shown graphically:



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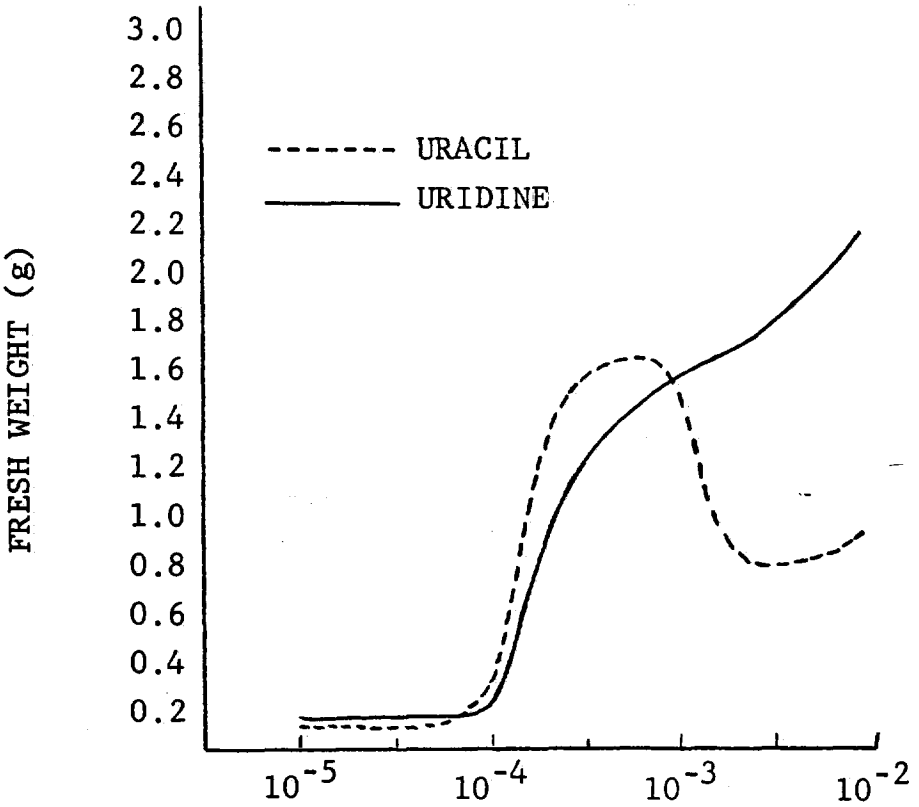
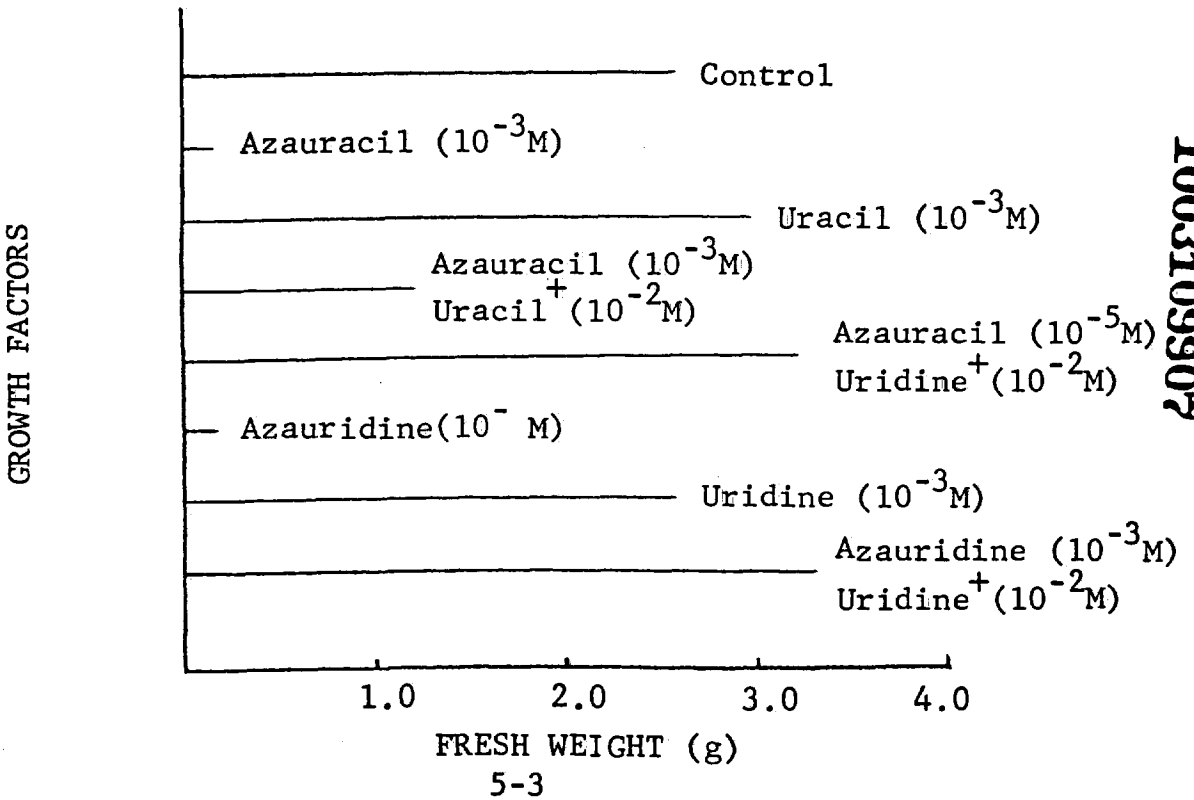


Azauracil, for instance, promotes the growth of tobacco cells at concentrations up to 10^{-6} M. At higher concentrations there is complete inhibition of growth.

The effect of combinations of plant inhibitors was also shown graphically (MH stands for maleic hydrazide):



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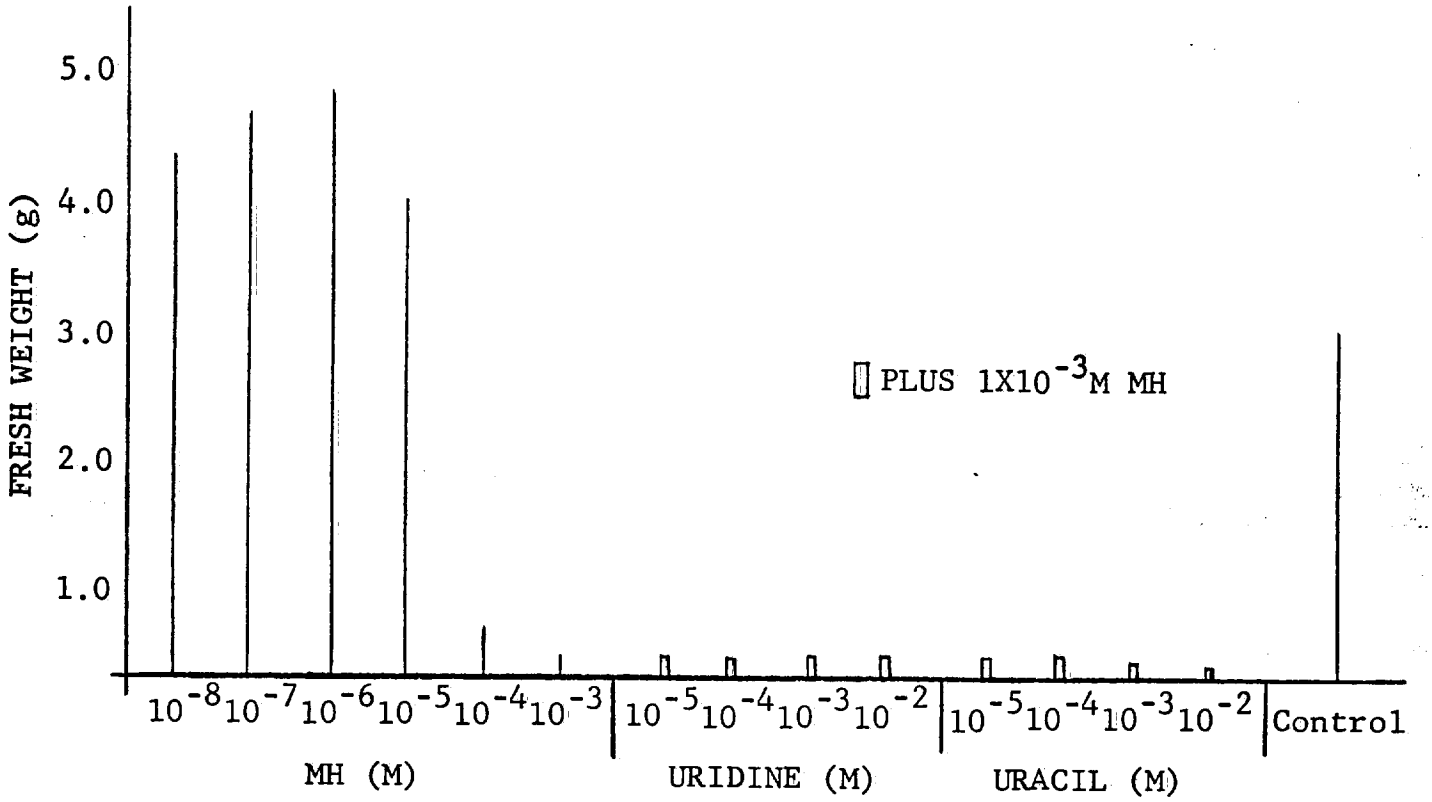

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